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10/544,120	08/02/2005	Yoshiaki Ohbayashi	0388-051649	8645

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EXAMINER	
PRITCHARD, JASMINE L	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/544,120	OHBAYASHI ET AL.	
	Examiner	Art Unit	
	JASMINE PRITCHARD	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 May 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) *1-8,15 and 16* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9-14 and 17-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 May 2009 and 02 August 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/28/2006, 7/19/2006 and 10/20/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 9-14 and 17-19 have been considered but are moot in view of the new ground(s) of rejection.

The double patenting rejection stands as a Non-statutory double patenting rejection. The Examiner made a mistake in the previous action in reference to the Statutory Double Patenting Rejection. The applicant failed to sufficiently and clearly address the 112 2nd paragraph rejections.

On page 12 of Applicant's Remarks, the applicant states that "Loeppert fails to teach or suggest where the active layer forms the diaphragm".

The Examiner respectfully disagrees and maintains that the active layer forms the diaphragm as claimed. When the connecting layer is formed on the diaphragm, it acts as a membrane acting as a diaphragm.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined

application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claim 9 is provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 14 of copending Application No. 10/565,059 in view of Loeppert and Loeppert et al..

This is a provisional obviousness-type double patenting rejection.

10/544120	10/565,059

Claim 9:	Claim 14:
A sound detecting mechanism comprising a pair of electrodes forming a capacitor on a substrate in which one of the electrodes is a back electrode forming perforations therein corresponding to acoustic holes and the other of the electrodes is a diaphragm, wherein a silicon nitride film is provided on a side adjacent a base of the substrate with respect to a membrane acting as the diaphragm formed on the substrate.	**A sound detecting mechanism comprising a pair of electrodes forming a capacitor on a substrate in which one of the electrodes is a back electrode forming perforations therein corresponding to acoustic holes and the other of the electrodes is a diaphragm,** wherein the diaphragm is made of at least one of a metal film and a laminated film, the metal film being formed by at least one of sputtering in a low temperature process, vacuum vapor deposition and plating technique, the laminated film being formed of an organic film, a conductive film, or any combination thereof, the back electrode is formed on the substrate, and a spacer is formed from part of a sacrificial layer comprising an organic film for determining a distance between the diaphragm and the back electrode.

Claims 9 and 10 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4 and 5 of copending Application No. 10/544,253 in view of Loeppert and Loeppert et al..

This is a provisional obviousness-type double patenting rejection.

10/544,120	10/544,253
Claim 9: **A sound detecting mechanism comprising a pair of electrodes forming a capacitor on a substrate in which one of the electrodes is a back electrode forming perforations therein corresponding to acoustic holes and the other of the electrodes is a diaphragm,** wherein a silicon nitride film is provided on a side adjacent a base of the substrate with respect to a membrane acting as the diaphragm formed on the substrate.	**Claim 1:** **A sound detecting mechanism comprising a pair of electrodes forming a capacitor on a substrate in which one of the electrodes is a back electrode forming perforations therein corresponding to acoustic holes and the other of the electrodes is a diaphragm,** wherein a multilayered assembly is mounted on the substrate, the multilayered assembly formed of the diaphragm, a sacrificial layer and the back electrode superposed in series by vapor deposition technique; the sacrificial layer is etched relative to the multilayered assembly formed of the diaphragm, the sacrificial layer and the back electrode, thereby

	defining a void area between the diaphragm and the back electrode, with the sacrificial layer remaining at outer peripheral portions of the void area; and the back electrode being formed by polycrystal silicon of 5 .mu.m to 20 .mu.m in thickness; and the substrate comprises a single crystal silicon on insulator (SOI) structure wafer including a silicon oxide film or a silicon nitride film formed on a monocrystal silicon substrate and a polycrystal silicon film formed on the silicon oxide film or the silicon nitride film.
Claim 10: **The sound detecting mechanism of claim 9, wherein the substrate includes a support substrate having a monocrystal silicon substrate acting as the base thereof,**	**Claim 4:** **The sound detecting mechanism of claim 1, wherein the substrate comprises a support substrate having a monocrystal silicon substrate acting as the base thereof;** and the support substrate consists of a single crystal silicon on insulator (SOI) wafer. **Claim 5:**

wherein an SOI wafer having the silicon nitride film held between an active layer and a built-in oxide film layer is used as the support substrate whereby **the active layer forms the diaphragm.**	The sound detecting mechanism of claim 4, wherein the single crystal silicon on insulator **(SOI) wafer has an active layer used as the diaphragm.**

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 9-15 and 17-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

2. In claim 9, line 2, the applicant states "…electrodes forming a capacitor on a **substrate** in which …") and in lines 4 and 5 the applicant states "… the substrate …" In the Specification and the Drawings the Applicant has defined a [A – support substrate] and [301—monocrystal silicon substrate]. As shown above the Applicant only claims "a substrate". Therefore the Applicant has failed to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. In claims 10-13, in line 2, "the substrate" is indefinite for the same reasons above.

4. Claims 14, 15 and 17-19 are rejected to as being dependent upon a rejected base claim. See above.

5. In claim 12, line 4, the applicant states "…and a **silicon film** is further …"). In the Specification and the Drawings the Applicant has defined a [302 – silicon oxide film] and [303 - silicon nitride film]. As shown above the Applicant only claims "a silicon film". Therefore the Applicant has failed to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 14, it is not clear what the Applicant meant by "a silicon substrate of orientation is used ..."

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> *(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.*

Claims 9-15 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loeppert (US 5,490,220).

Regarding Claim 9:

Loeppert teaches a sound detecting mechanism (See title **and** notice *"Solid State Condenser and Microphone Devices"*) comprising a pair of electrodes (12 – *diaphragm* **and** 64 –

backplate **and** see column 1, lines 16-17 **and** notice *"A typical condenser microphone is composed of ... a diaphragm/backplate pair forming a capacitor"*, note the pair of electrodes forming a capacitor on a substrate is a well known process.) forming a capacitor on a substrate (14 – *silicon wafer*) in which one of the electrodes is a back electrode (64 - *backplate*) forming perforations (66 – *perforations*) therein corresponding to acoustic holes and the other of the electrodes is a diaphragm (12 – *diaphragm*), wherein a silicon nitride film (30 – *nitride layer*) is provided and a membrane (44 – *connecting layer*) acting as the diaphragm (12 – *diaphragm*) formed on the substrate (14 – *silicon wafer,* **please note** to the best of the Examiners knowledge, the Examiner has defined "substrate" as 301- monocrystal silicon). Loeppert does not explicitly teach a silicon nitride film is provide between a side adjacent a base (See Figure 6 **and** notice the Examiner defines the base of the substrate as 14 – *silicon wafer*) of the substrate (See Figure 6 **and** notice *a silicon nitride film is provided on a side adjacent a base of the substrate with respect to a membrane acting as the diaphragm formed on the substrate*) for the purpose of completing a capacitive connection. Loeppert et al. teaches a silicon nitride film (31 – *dielectric layer*) is provide between (See figure 1) a side adjacent a base of the substrate (30 – *substrate*) for the purpose of completing a capacitive connection.

Regarding Claim 10:

Loeppert teaches a sound detecting mechanism (See title **and** notice *"Solid State Condenser and Microphone Devices"*), wherein the substrate (14 - *silicon wafer*) includes a support substrate (14 - *silicon wafer*) having a silicon substrate (14 - *silicon wafer*) acting as the base (14 - *silicon wafer*) thereof, wherein an SOI wafer (Figure 6 **and please note** to the best of

the Examiners knowledge, the Examiner has defined "SOI wafer" as the entire microphone unit of Figure 6**)** having the silicon nitride film (30 – *nitride layer*) held between an active layer (44 – *connecting layer*) and a built-in oxide film layer (16 – *oxide film layer*) is used as the support substrate (See Figure 6) whereby the active layer forms the diaphragm (12 – *diaphragm*). Loeppert does not specifically teach or restrict a monocrystal silicon substrate (14 - *silicon wafer*). However, it is well known in the art to provide monocrystal silicon for the substrate in capacitive acoustic transducers or sound detecting mechanisms.

Regarding Claim 11:

Loeppert teaches a sound detecting mechanism (See title **and** notice *"Solid State Condenser and Microphone Devices"*), wherein the substrate (14 - *silicon wafer*) includes a support substrate (14 - *silicon wafer*) having a silicon substrate (14 - *silicon wafer*) acting as the base (14 - *silicon wafer*) thereof, wherein an SOI wafer (Figure 6 **and please note** to the best of the Examiners knowledge, the Examiner has defined "SOI wafer" as the entire microphone unit of Figure 6**)** having the silicon nitride film (30 – *nitride layer*) held between a built-in oxide film layer (16 – *oxide film layer*) and the base is used as the support substrate (14 - *silicon wafer*). Loeppert does not specifically teach or restrict a monocrystal silicon substrate (14 - *silicon wafer*). However, it is well known in the art to provide monocrystal silicon for the substrate in capacitive acoustic transducers or sound detecting mechanisms.

Regarding Claim 12:

Loeppert teaches a sound detecting mechanism (See title **and** notice *"Solid State Condenser and Microphone Devices"*), wherein the substrate (14 - *silicon wafer*) includes a support substrate (14 - *silicon wafer*) having a silicon substrate (14 - *silicon wafer*), wherein a silicon oxide film (16 – *oxide film layer*) is formed on the support substrate (14 - *silicon wafer*), the silicon nitride film (30 – *nitride layer*) is formed on the silicon oxide film (16 – *oxide film layer*), and a silicon film (24 – *silicon nitride layer*) is further formed on the silicon nitride film (30 – *nitride layer*). Loeppert does not specifically teach or restrict a monocrystal silicon substrate (14 - *silicon wafer*). However, it is well known in the art to provide monocrystal silicon for the substrate in capacitive acoustic transducers or sound detecting mechanisms.

Regarding Claim 13:

Loeppert teaches a sound detecting mechanism (See title **and** notice *"Solid State Condenser and Microphone Devices"*), wherein the substrate (14 - *silicon wafer*) includes a support substrate (14 - *silicon wafer*) having a silicon substrate (14 - *silicon wafer*) acting as the base (14 - *silicon wafer*) thereof, wherein a laminated layer consisting of a silicon oxide film (16 – *oxide film layer*) and the silicon nitride film (30 – *nitride layer*) is formed between the membrane (44 – *connecting layer*) acting as the diaphragm (12 – *diaphragm*) and the support substrate (14 - *silicon wafer*), where the thickness of the silicon nitride film (30 – *nitride layer*) is selected within a range of 0.1 .mu.m through 0.6 .mu.m (column 3, line 45). Loeppert does not explicitly teach or reject a film thickness ratio, (silicon oxide film)/(silicon nitride film)=R, is determined as 0<R<=4 for the purpose of gaining a desired frequency. However, Loeppert does not limit any thickness ratios. Therefore it would have been obvious to one skilled in the art at

the time of the invention to provide any thickness ratio depending on the applications and the desired frequency characteristics.

Regarding Claims 14 and 17-19:

Loeppert teaches a sound detecting mechanism (See title **and** notice *"Solid State Condenser and Microphone Devices"*). Loeppert does not specifically teach or restrict a silicon substrate (14 - *silicon wafer*) of orientation is used as the monocrystal silicon substrate. However, it is well known in the art to provide monocrystal silicon for the substrate in capacitive acoustic transducers or sound detecting mechanisms.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Loppert et al. U.S. Patent 5,870,482 and US PGPub 2002/0067663 A1.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASMINE PRITCHARD whose telephone number is (571)270-3712. The examiner can normally be reached on Monday-Friday 7:30am-5:00pm est.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz can be reached on 571-272-7499. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jasmine Pritchard/
Examiner, Art Unit 2614

/Suhan Ni/
Primary Examiner, Art Unit 2614